Properties of high strength palm oil clinker lightweight concrete containing palm oil fuel ash in tropical climate

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ABSTRACT

The rising amount of industrial by-products originating palm oil fuel ash (POFA) and palm oil clinker (POC) are disposed off as wastes at dumping areas resulting in environmental pollution. Simultaneously, both granite and limestone quarrying to cater the demand of concrete industry leads to deforestation that jeopardise the wildlife habitats and ecological imbalance in future. The present study aims to investigate long-term mechanical properties of high strength palm oil clinker concrete containing ground POFA. Concrete mixtures containing 0% to 40% POFA were prepared and cured up to 1 year in humid tropical environment. The application of 10% POFA enhanced the concrete strength significantly compared to other mixtures. The twofold action of POFA through pozzolanic reaction and pores filling which refines the internal structure resulted in a denser concrete that is able to sustain higher loads. It is concluded that ground POFA is suitable for use in POC concrete thus reducing environmental issues initiated by palm oil industry, particularly via its wastes.

Keywords: High strength palm oil clinker concrete**;** Ground palm oil fuel ash**;** Long-term mechanical properties**;** Denser concrete**;** Enhanced strength